

Example 1

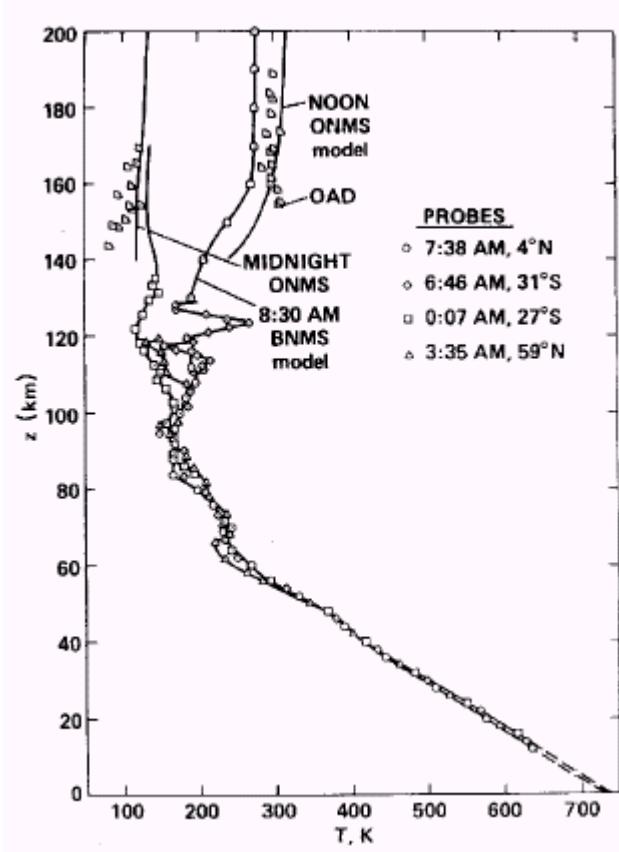
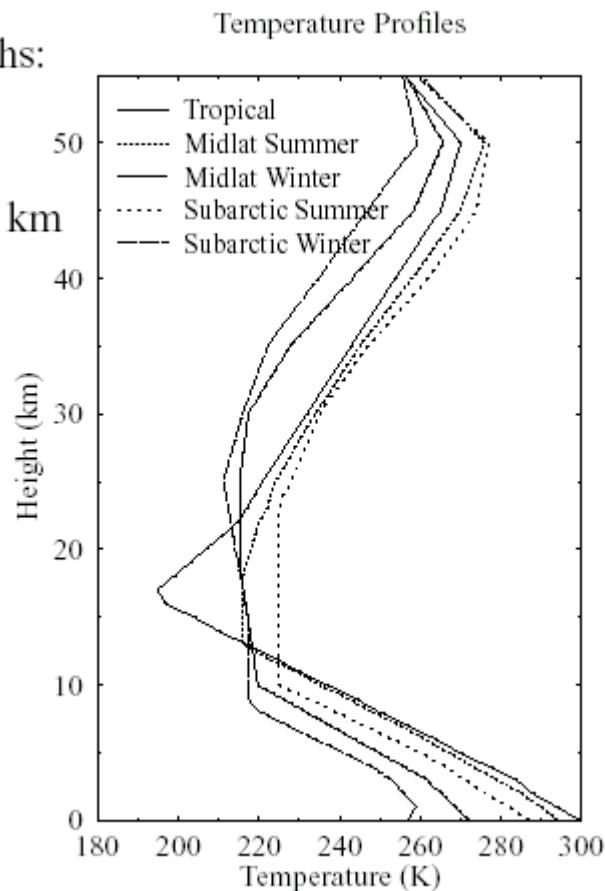
a) What altitude is at the triple point of water (273 K) in the standard tropical atmosphere, midlatitude winter atmosphere, and the atmosphere of Venus?

Reading off the graphs:

$$\text{tropical } z_f = 5 \text{ km}$$

$$\text{midlat winter } z_f = 0 \text{ km}$$

$$\text{Venus } z_f = 58 \text{ km}$$



b) Estimate the mass mixing ratio of water vapor in a standard tropical atmosphere at the surface and at the tropopause.

At the surface the mass mixing ratio is $q = \rho_v/\rho = 19/1200 = 0.016$. The tropopause in the standard tropical atmosphere is at 17 km, where the mass mixing ratio is $q = 5 \times 10^{-4}/170 = 3 \text{ ppm}$.

